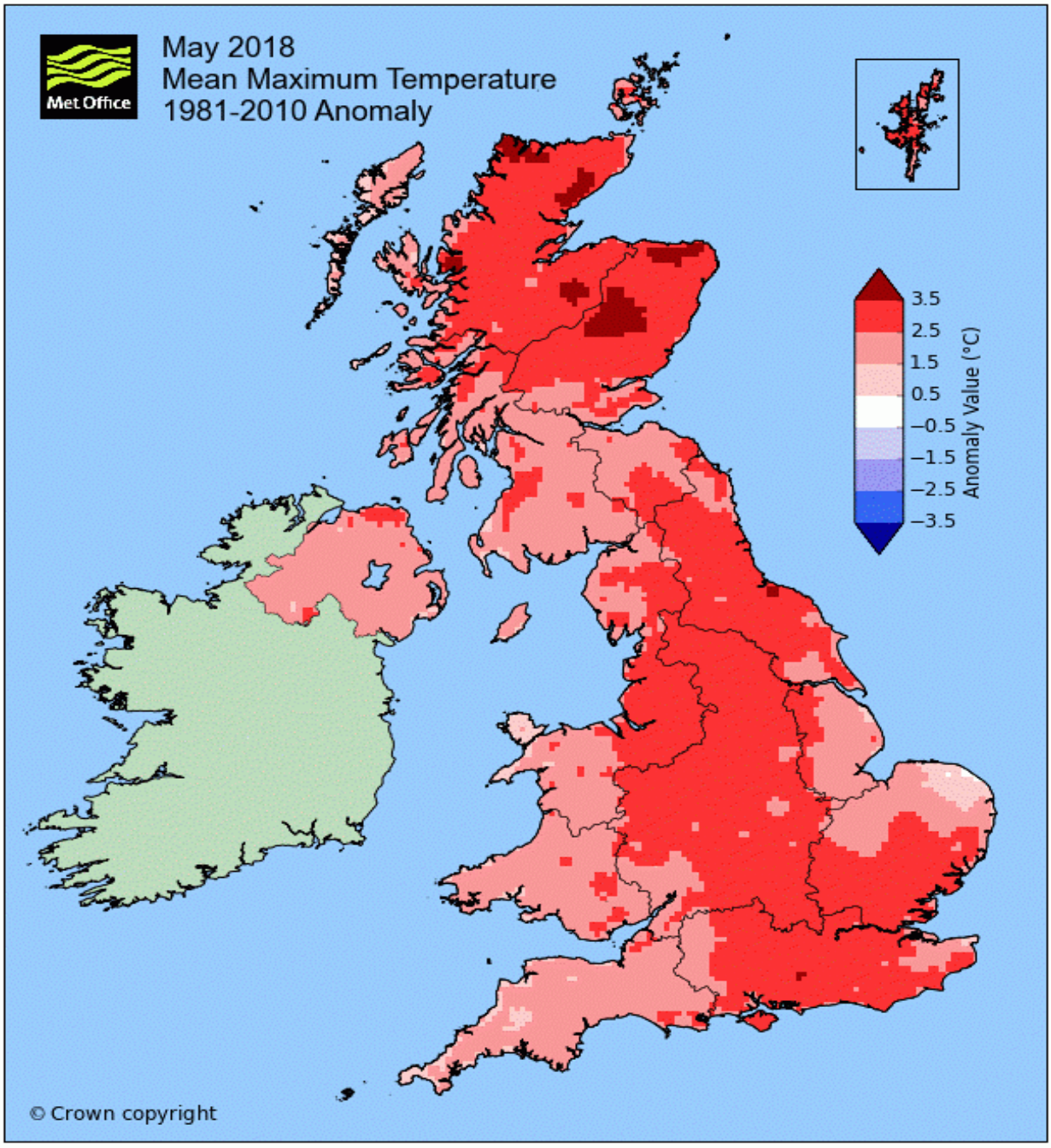
Met Office temperature records – what do we monitor and how far do they go back?

Description

May saw more than its normal share of fine sunny days and notably high temperatures, reaching a peak of 28.7 Celsius at Northolt on 7th May to coincide with the early May bank holiday. That was just one place on one day. To get a broader picture we also look at the average temperatures across the whole month and all of the UK. The average daily maximum temperature in May was 17.2 Celsius. The persistent sun and warmth meant that this was the highest average maximum temperature on record for May.

But what does “highest maximum temperature for May” mean and how is it calculated? What types of temperature do we monitor, and how do they differ?

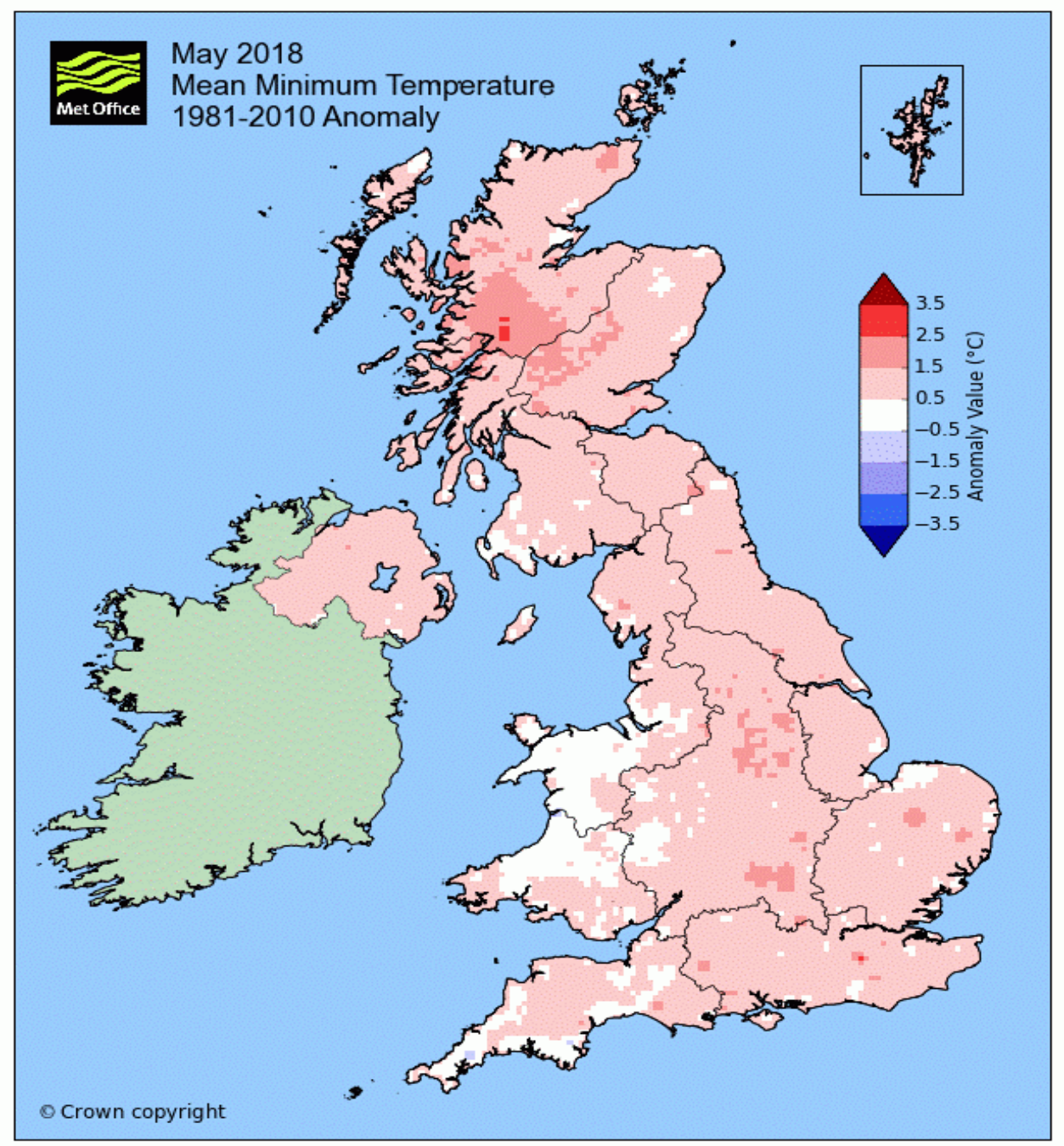


Average of daily maximum temperatures for May. Setting a new record high for the national series.

Maximum, Minimum and Mean temperatures

All our standard temperature observations are made from the UK's weather station network. Modern automated technology means we can actually track changes in temperature minute-by-minute. It hasn't always been this way though, and historically it was not very practical to manually record the weather every minute of every day. Thankfully, British scientist James Six invented a maximum-minimum

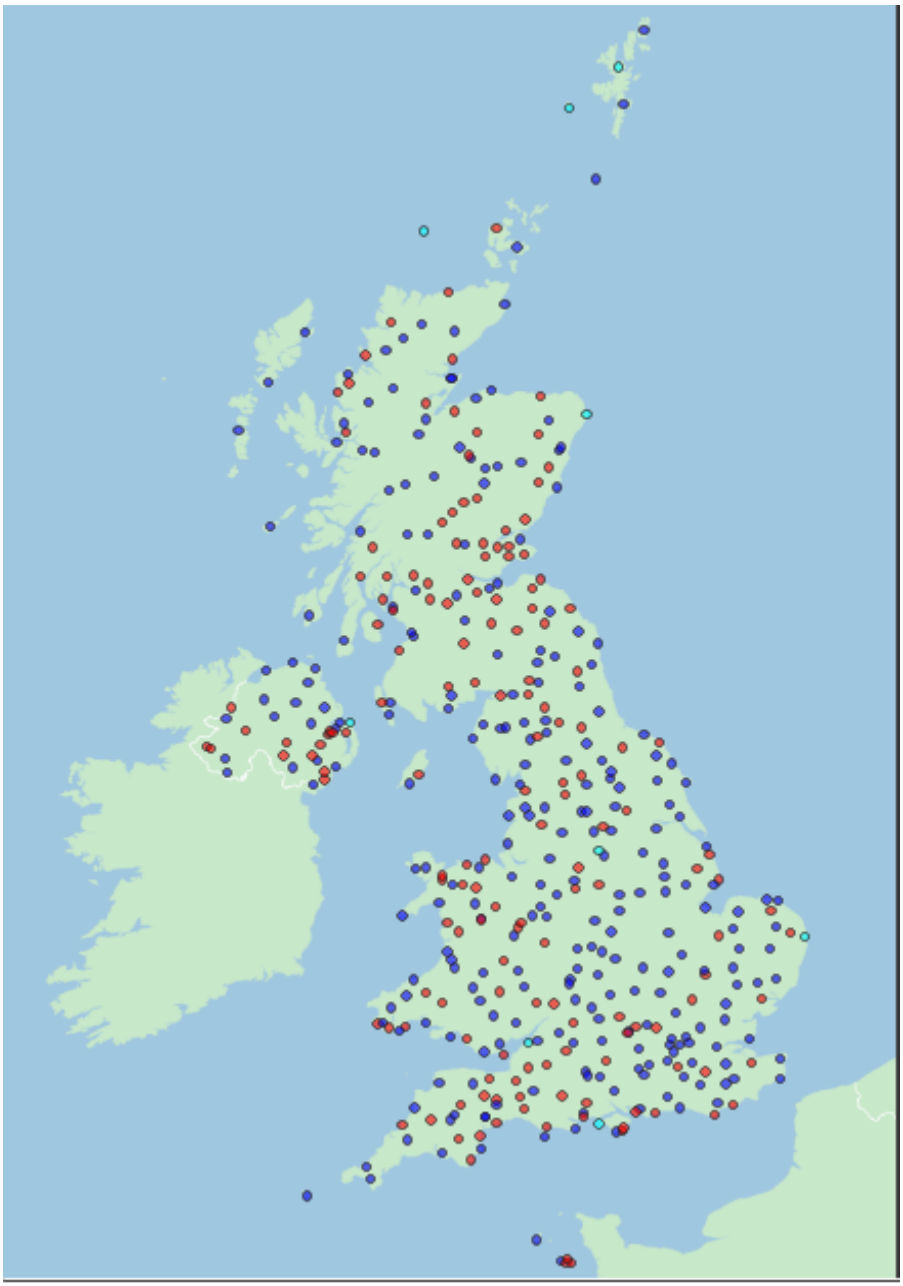
thermometer in the late 18th Century that could record the highest and lowest temperature recorded over a period of time. This invention allowed early weather observers to summarise the temperature of the day based on these two extremes, and the average of the maximum and minimum is widely used as an estimate of the mean temperature. This practice continues to this day, providing the UK with some very long records of the highs and lows of temperature across the country.



Average of daily minimum temperatures for May. Ranked joint 10th warmest in the national series.

Station Records

The Met Office has routinely provided summaries of the monthly average of the maximum, minimum and mean temperature for the weather stations located throughout the UK since 1884. For a few stations we hold records going back much further. These station records provide an accurate picture of the month-to-month and year-to-year variations in temperature at particular locations. Our present-day observing network is comprised of over 400 stations.



Map showing the present-day weather observation network of automatic (blue) and manual (red) stations.

Find a selection of our historic station series here.

Central England Temperature records

The Central England Temperature (CET) series is the remarkable achievement of the scientist Gordon Manley. In the mid 20th Century Gordon Manley undertook painstaking research to uncover old weather records and diaries stretching back to the mid 17th Century and from these created the Central England Temperature series, providing an estimate of the monthly mean temperature of a region broadly representative of central England.

This work was continued by the Met Office to maintain a Central England Temperature record to this day, providing monthly mean temperature from 1659, daily mean temperatures from 1772, and separate maximum and minimum temperatures from 1878. The different start dates reflect the historical availability of the different types of observations.

The current CET series is, for historical consistency, comprised of observations from just three weather stations, forming a triangle encompassing roughly Lancashire, London and Bristol. This dataset is the longest of its kind in the world, and is an invaluable resource for investigating variations in our climate across several centuries.

However, the CET does not cover the whole of the UK or take full advantage of the complete network of several hundred weather stations currently monitoring weather across the whole country. The CET series is available here.

National records

For most of the 20th and 21st Century we have had hundreds of observing stations across the UK recording maximum, minimum and mean temperatures. We could take a simple average of all of these observations to estimate a national average temperature. However, the precise number and distribution of stations across the country has changed over time, so a simple average is not the best way to estimate the national record. Instead we take a slightly more sophisticated approach. All available observations from a given date or month are interpolated to a uniform grid of points 5km by 5km covering all land areas of the UK. This gridding method also accounts for factors such as terrain height (mountain tops are cooler on average than lowlands), coasts (the sea can keep coastal areas cooler by day and warmer by night), and cities (the urban heat island effect means large cities are warmer than their rural surroundings). An average value is then calculated from the resulting grid of points. This approach provides the best estimate we have of national records.

There are currently sufficient temperature data on our computer archives for this gridding method back to 1910, providing over 100 years of national records for the UK, Scotland, England, Wales and Northern Ireland. So these records provide our official UK national climate series – the records that you will see quoted when the Met Office releases statistics.

The national and regional series from 1910 available to download here.

So what is the best measure of temperature for monitoring climate?

The answer is all of the above. The different types of data provide complementary information, all of which are routinely used to monitor UK climate and are published through the Met Office website each month.

Each of the maximum, minimum and mean temperature are all important in their own right for monitoring our climate and its extremes, and have all been observed for well over 100 years.

The national series derived from our gridded datasets from 1910 provide the most reliable estimates of UK-wide temperature, being based on all available station data. The CET series provide an invaluable and much longer climate series, providing a perspective of our climate for over 350 years. It is however based on a much more limited set of locations and stations. None of these records would be possible without the existence of high quality and long running historical station series. These station records provide observations for the site they are located in, but they are the firm foundations of our weather and climate observation heritage.

Date Created
June 2018

Will summer be a washout or a scorcher?

Description

The Met Office has recently released its contingency planners' outlook covering the period for June, July and August, with some sources suggesting this is predicting a summer heatwave.

But what does this early look at what might be in store for the summer actually say?

This summer, long-range weather systems show a slight increase in the chance of high pressure patterns across the UK and with this we see an increase in the chance of above-average temperatures. The point about the seasonal outlook, however, is that it gives us the more likely trends within the coming season. As a result, below-average temperatures, although less likely, remain a realistic possibility. A summer in which temperatures are more frequently slightly above average is the most likely scenario at this stage, but the fact that warmer and cooler outcomes than this are possible is a feature of the kind of information we are dealing with in long-range forecasting .

The outlook also gives an increase in the likelihood of drier-than-average conditions. The summer period is one of the driest times of year across the UK; with rainfall coming in short, occasionally intense, showery rain affecting some places but leaving nearby locations dry. On balance, below-average rainfall is more likely than above-average rainfall.

Jeff Knight, manager of modelling of climate variability at the Met Office, said: "Our long term outlook for the summer suggests a greater chance that temperatures will be above average, than below average. However, our outlook certainly doesn't imply a 3-month heatwave. As always with our climate there are likely to be large day-to-day and week-to-week variations the period. This is an outlook for the general themes over the summer and does not give detailed guidance on events like heatwaves."

Perception of good weather is often more dependent on rainfall amounts than temperature. For example, even though the UK had a run of 'poor' summers between 2007 and 2012, half of these summers had temperatures above the long-term average. The long-range outlook is primarily aimed at giving government departments and agencies a forward view of potential weather hazards in the months ahead. As such, it is a risk assessment rather than a more traditional type of forecast of what the weather is going to be. Using evidence from global weather observations and computer forecast systems, we can estimate the chances of different types of UK weather and how they could be modified in the coming months.

When you look back at the average mean temperature for the UK both 2017 and 2016 saw temperatures above the 13 C long-term average, with 14.5 C and 13.9 C respectively, and for summer as a whole the mean temperature was 14.7 C in 2017 and 14.9 C in 2016, both also above the long-term summer average of 14.4 C

You can find the current forecast on our website or mobile App or follow us on Twitter or Facebook, and as always our forecasts from one day to one month ahead can be relied upon to provide the best guidance on what to expect whatever weather patterns emerge.

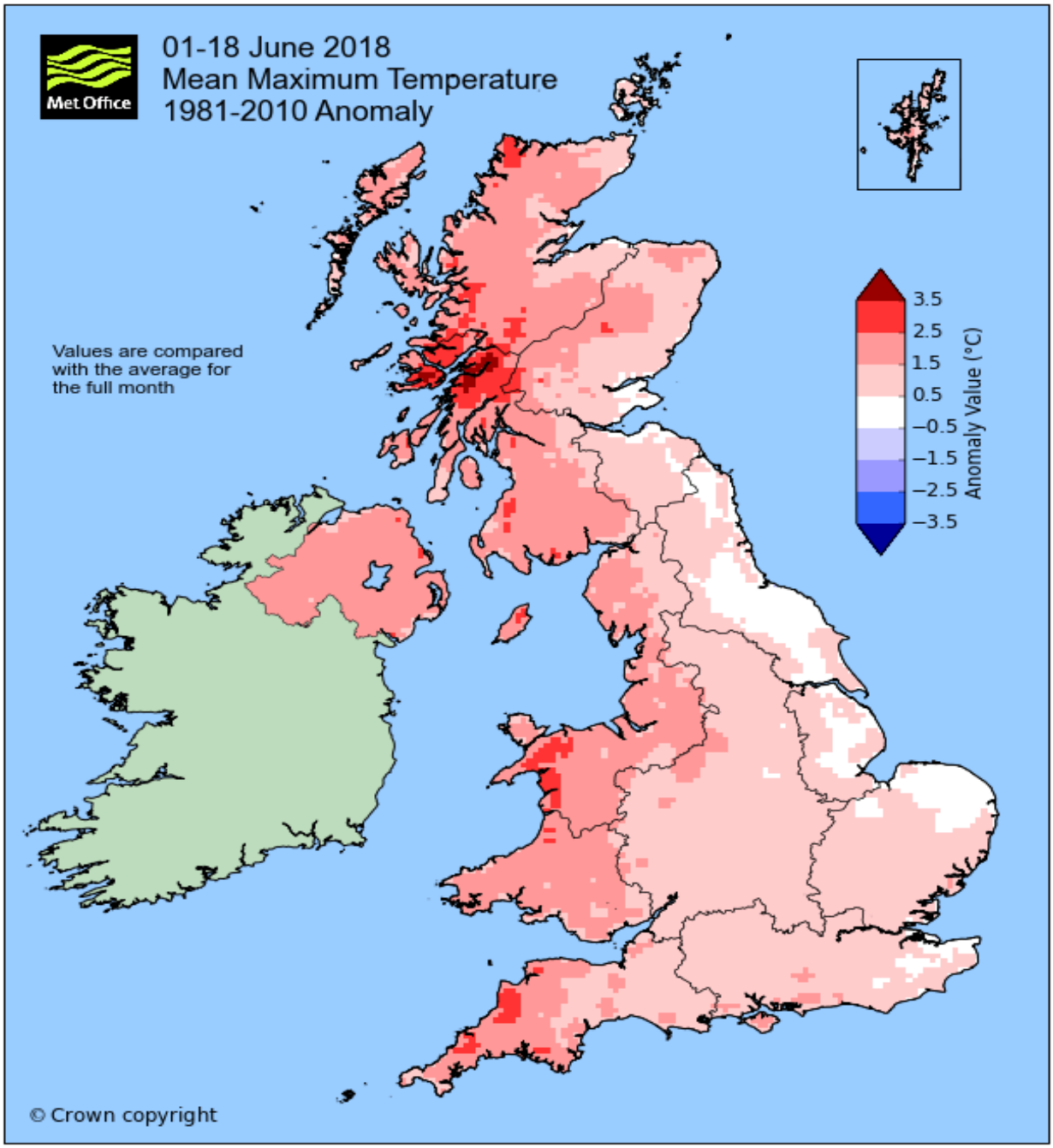
Date Created

June 2018

A warm and dry June so far

Description

As we reach the mid-point in June, statistics for the UK as a whole show that the weather has been warm and dry for many with temperatures over 1 degree above average so far and rainfall just 33% of the whole month's average total. This follows on from what was, for many, a dry and warm May.

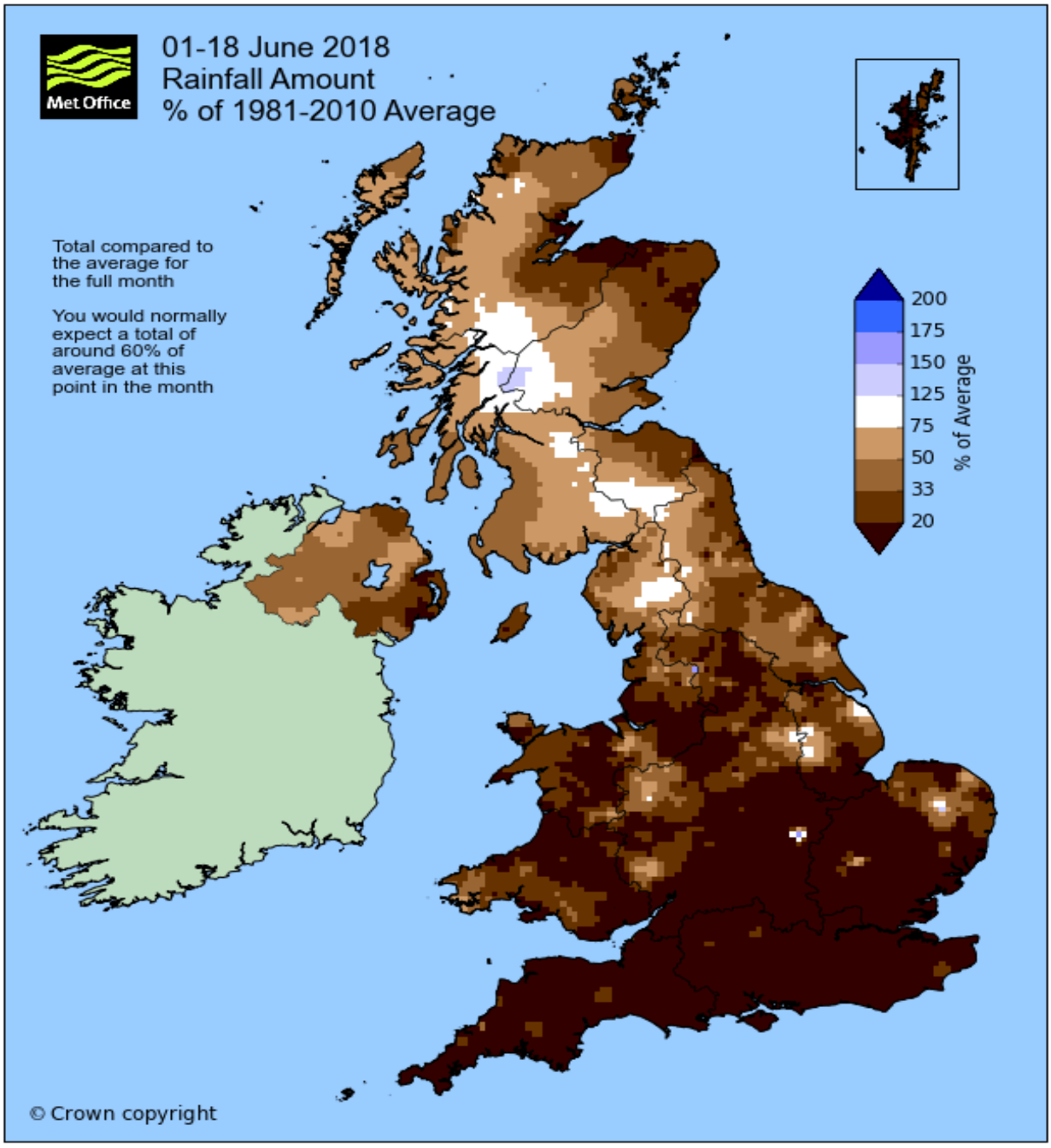


Max temperature for June 2018 so far compared to monthly average

However, the UK-wide statistics hide some regional variations, with Central, Southern and South East England having had just 2mm of rainfall (1 to 16 June) – 5% of the June average, while western Scotland has had 55mm (1 to 16 June) – 51% of the June average.

Some of the driest counties in southern areas of the UK include Essex, which has only received 1.4 mm of rainfall, 3% of the month's average, Dorset, which has had 1.2mm of rain, 2% of the month's average, and Buckinghamshire, which has had 2.1mm of rain, 4% of the month's average. Without further rainfall this month, some southern counties could see one of the driest Junes on record.

Conversely, Western Scotland has seen above average rainfall with Argyllshire having received 76mm so far this month – 64% of the June average, Dumfriesshire has received 57mm – 66% of the June average, and Stirlingshire has received 62mm – 67% of the June average.



Rainfall for June 2018 so far compared to monthly average

While temperatures overall this month so far have been above average there have also been some regional differences, with the east side of the country generally being nearer average, for example Lincolnshire and Kent are so far just 0.4 °C above the average maximum. However, the west side of the UK has seen higher temperatures with areas such as Cornwall and Cardiganshire being 2 °C above the average maximum so far this month.

Looking back at the rainfall figures for spring it was north-western areas that were the driest, with only around half the season's average, the reverse of rainfall amounts so far this month. It was however a rather wet spring in most eastern, central and southern areas, with rainfall 50% above normal in the

wettest places.

The latest figures from UK water companies show that following the spring rainfall the water resources outlook remains healthy for the summer particularly in the south and east, a significant transformation from the situation at the start of 2018.

The Environment Agency is continuing to urge us all to think carefully about our water consumption saying the average person in England uses 140 litres per day. They published a recent report examining water resources.

Paul Hickey, Environment Agency Deputy Director of water resources said:

“At the start of June for most areas of England, the river flows, groundwater levels and soils were normal for the time of year. This followed the rain in early spring, which helped groundwaters in the south east to recover from previously low levels. During dry spells, it is not unusual for some rivers and lakes in faster responding catchments to drop quickly, but they tend to recover quickly when the rain returns. The Environment Agency continues to work with water companies, businesses and farmers to provide advice, helping to balance the needs of water users and minimise impacts on the environment of any dry weather.”

As we look at the rest of June, the forecast shows high pressure building across the south of the UK later this week with indications this will last into next week as well – meaning dry settled conditions for the south. Further north, the weather looks more unsettled with a chance of rain or showers.

Date Created
June 2018